Chapter 4

UI Module UE4S

Original 03/98

CONTENTS

UIF Module 4–3
Introduction 4–3
Baseband Block Diagram 4–4
The Engine Interface 4–5
The LCD Module Interface 4–7
Functional Description 4–8
Power Distribution Diagram 4–8
Display Circuit 4–8
Keyboard 4–9
Keyboard Matrix 4–10
Power Key 4–10
Backlighting 4–11
Display 4–12
Keyboard 4–12
Buzzer 4–12
Speaker 4–13
Parts list of UE4S (EDMS Issue 4.1) Code: 0201144 4–14

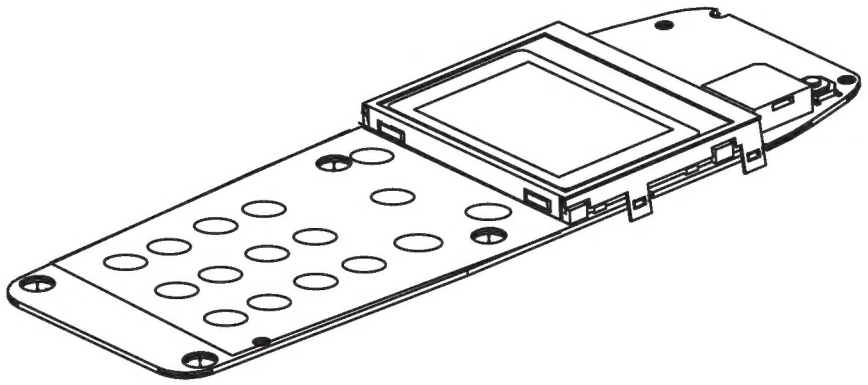
Schematic Diagrams UIF/A3

Circuit Diagram of UIF Module (Version 3 Edit 49) for layout 03 4/A3–1
Circuit Diagram of Speaker and LCD Modules for layout 03 .. 4/A3–2
Circuit Diagram of Keyboard (Version 3 Edit 45) for layout 03 . 4/A3–3
Layout Diagram of UE4S (Version 03) 4/A3–4

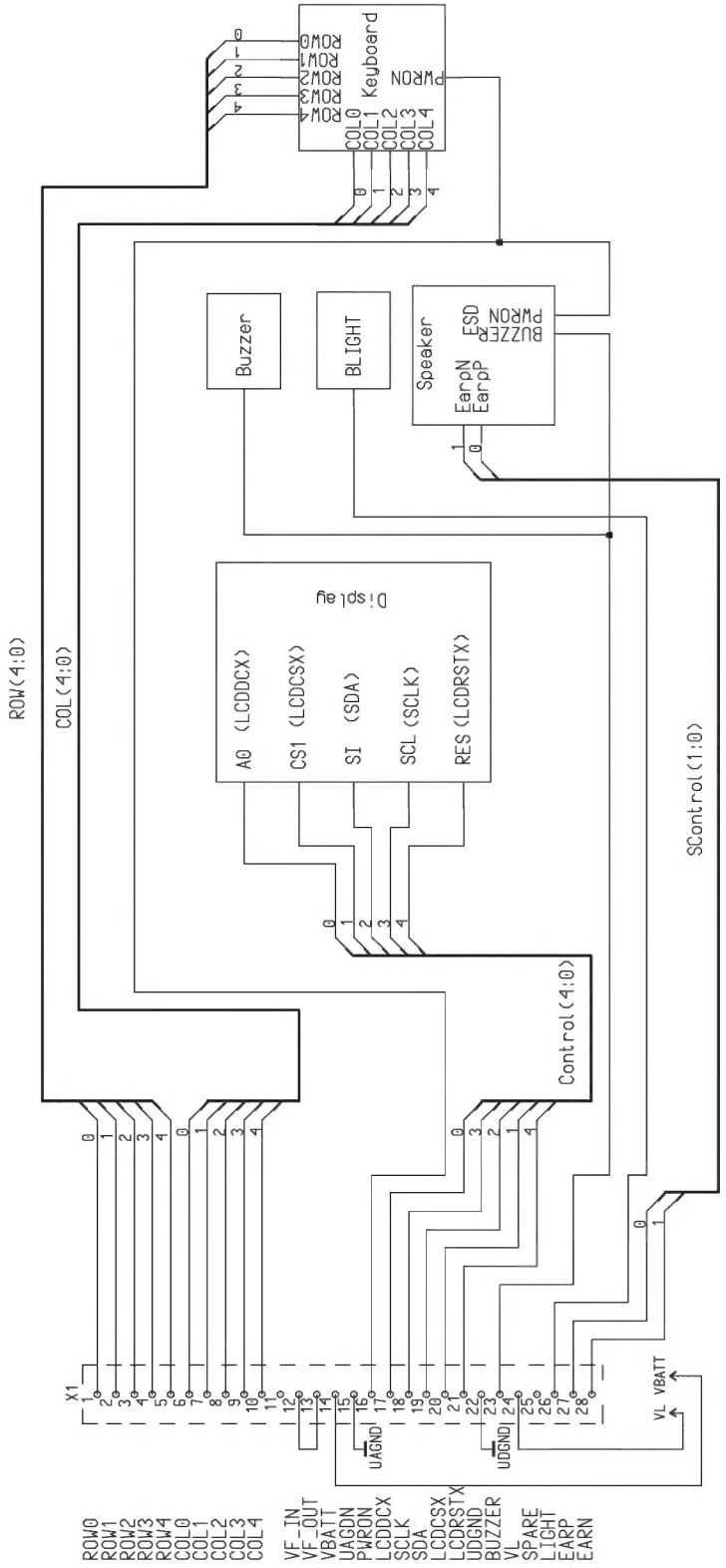
UIF Module

Introduction

The UI module UE4S is a four layer PCB, which is connected to the system/RF PCB with a 28–pin spring connector.



Baseband Block Diagram

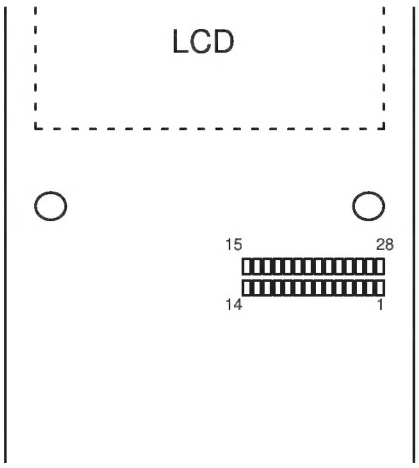


The Engine Interface

Pin	Line Symbol	Parameter	Min	Typ	Max	Unit	Notes
1	ROW0	Keyboard matrix row 0	0 0.7xVBB		0.3xVBB VBB	V	Low High
2	ROW1	Keyboard matrix row 1	0 0.7xVBB		0.3xVBB VBB	V	Low High
3	ROW2	Keyboard matrix row 2	0 0.7xVBB		0.3xVBB VBB	V	Low High
4	ROW3	Keyboard matrix row 3	0 0.7xVBB		0.3xVBB VBB	V	Low High
5	ROW4	Keyboard matrix row 4	0 0.7xVBB		0.3xVBB VBB	V	Low High
6	COL0	Keyboard matrix column 0, used for flip identification	0 0.7xVBB		0.3xVBB VBB	V	Flip Open Flip Closed
7	COL1	Keyboard matrix column 1	0 0.7xVBB		0.3xVBB VBB	V	Low High
8	COL2	Keyboard matrix column 2	0 0.7xVBB		0.3xVBB VBB	V	Low High
9	COL3	Keyboard matrix column 3	0 0.7xVBB		0.3xVBB VBB	V	Low High
10	COL4	Keyboard matrix column 4	0 0.7xVBB		0.3xVBB VBB	V	Low High
11	Signal1	Flip interrupt, not used	0 0.7xVBB		0.3xVBB VBB	V	
12	VF_IN	Flash in	4.8	5.0	5.2	V	Connected #13
13	VF_OUT	Flash out	4.8	5.0	5.2	V	Connected #12
14	VBATT	Battery voltage	3.0		5.1	V	
			60	75	100	mA	For lights
				110	300	mA	For buzzer
15	UAGND*	Analog ground		0		V	
16	PWRON	Power on key	0 0.7xVBB		0.3xVBB VBB	V	Low / Power on High
17	LCDCDX	LCD driver code/data selection	0 0.7xVBB		0.3xVBB VBB	V	Low High
18	SCLK	LCD driver serial clock	0 0.7xVBB		0.3xVBB VBB	V	Low High

Pin	Line Symbol	Parameter	Min	Typ	Max	Unit	Notes
			0		4.0	MHz	
19	SDA	LCD driver serial data	0 0.7xVBB		0.3xVBB VBB	V	Low High
20	LCDCSX	LCD driver chip select	0 0.7xVBB		0.3xVBB VBB	V	Low / Active High
21	LCDRSTX	LCD driver reset	0 0.7xVBB		0.3xVBB VBB	V	Low / Active High
22	UDGND*	Digital ground		0		V	
23	BUZZER	Buzzer PWM control	0		2.85	V	
24	VL	Supply voltage	2.7	2.8	2.85 300	V uA	
25	SPARE	Call indicator LED	0 0.7xVBB		0.3xVBB VBB	V	Not used in UI
26	LIGHT	Illumination control	0 0.7xVBB		0.3xVBB VBB	V	Low High / Active
27	EARN	Speaker neutral	0		1.78	V_{pp}	
28	EARP	Speaker positive	0		1.78	V_{pp}	

* Ground position is on connector NOT BATTERY.



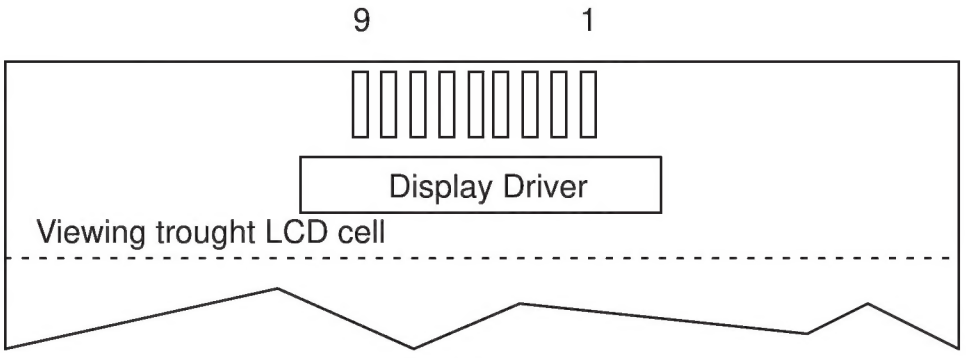
UIM connector pads viewed from the GND side

The LCD Module Interface

Pin	Line Symbol	Parameter	Mini-mum	Typical / Nomi-nal	Maxi-mum	Unit	Notes
1	VL	Supply voltage	2.7	2.8	2.85	V	
					300	uA	
2	SCLK	Serial clock input	0		4.0	MHz	VBB = 2.7V
			0		VBB	V	
3	SDA	Serial data input	0 0.7xVBB		0.3xVBB VBB		
4	LCDCDX	Control/display data flag input	0 0.7xVBB		0.3xVBB VBB		Control Data
5	LCDCSX	Chip select input	0 0.7xVBB		0.3xVBB VBB		Active
6	OSC**	External clock for LCD	30.4	32.0	33.6	kHz	Connected to VBB on UI
7	UDGND*	Ground		0		V	
8	VOUT	DC/DC voltage converter output			9		
9	LCDRSTX	Reset	0 0.7xVBB		0.3xVBB VBB		Active

* Ground position is on connector NOT BATTERY.

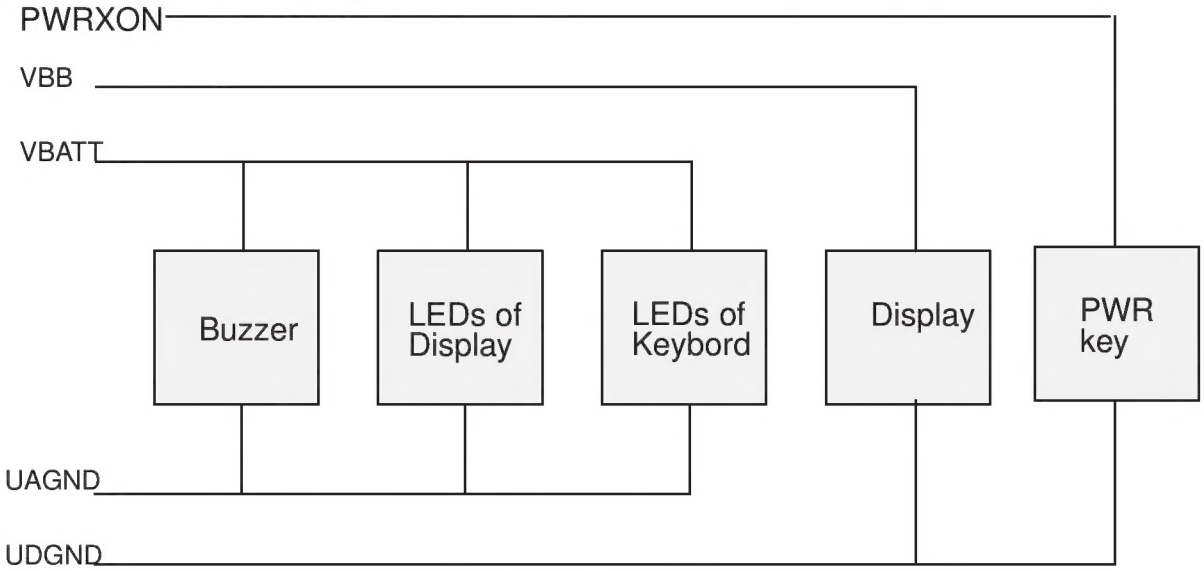
** External oscillator is not used in UE4S.



LCD Module Interface

Functional Description

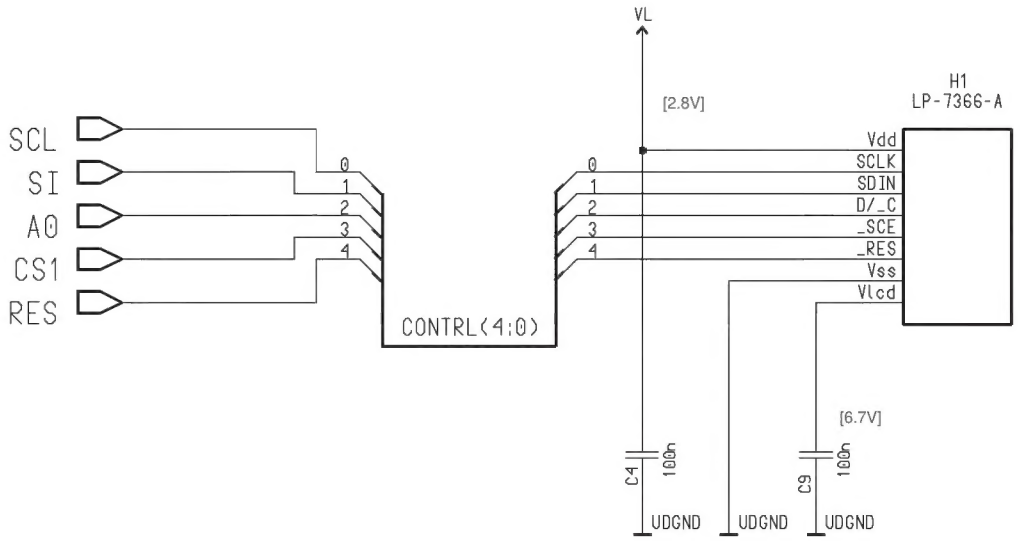
Power Distribution Diagram



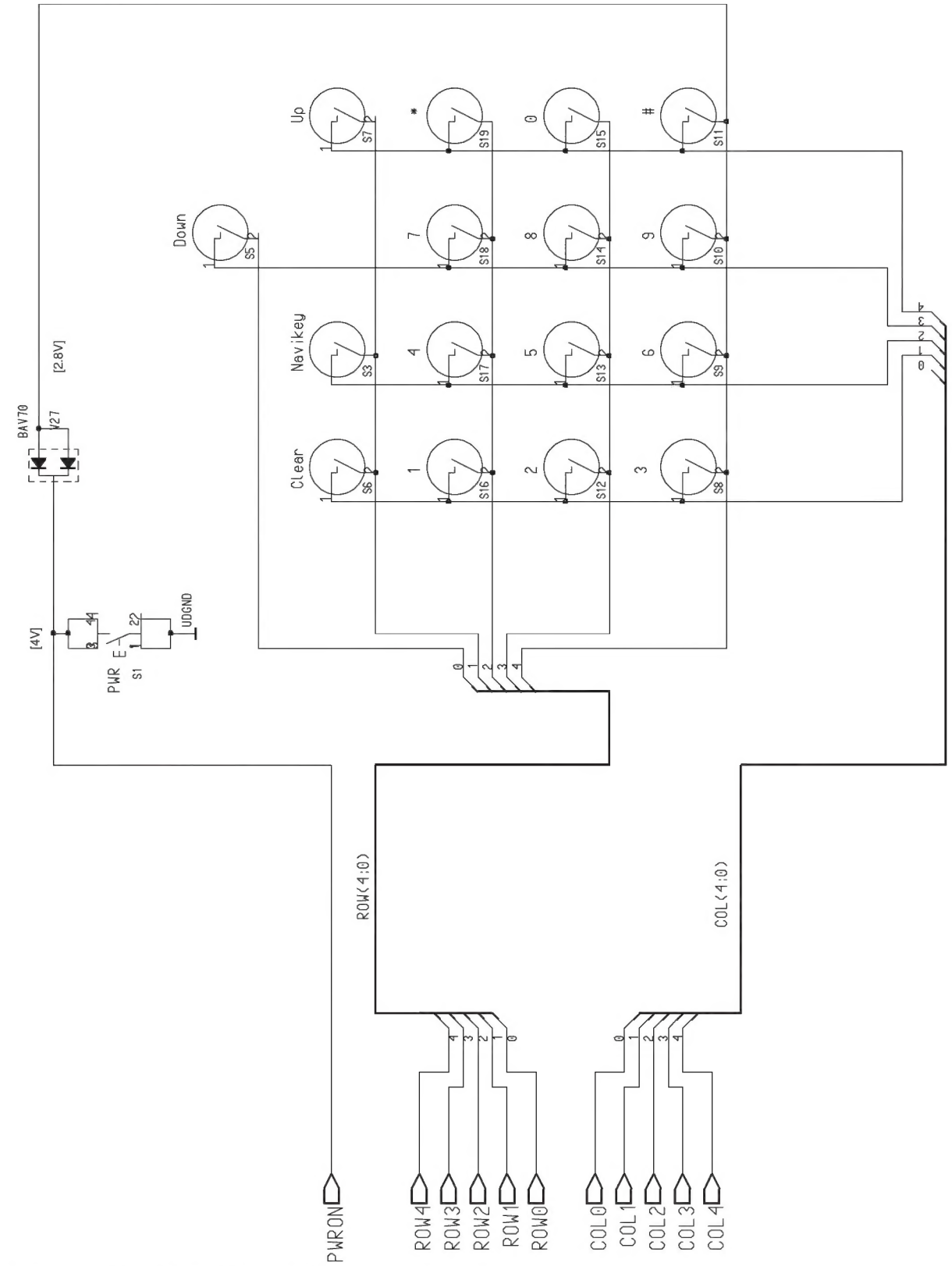
Display Circuit

The display circuit includes LCD module GD40 and two capacitors. The LCD module is COG (Chip on Glass) technology. The connection method for chip on the glass is ACF, Adhesive Conductive Film. The LCD module is connected to UI board with gold wired elastomer. Capacitors are placed on UI PCB.

The display driver includes hw–reset, voltage tripler or quadrupler which depends on temperature, temperature compensating circuit and low power control. Driver includes 84x48 RAM memory which is used when some elements are create on display. Elements can be create with software. Driver doesn't include CG–ROM. One bit in RAM is same as one pixel on display.



Keyboard



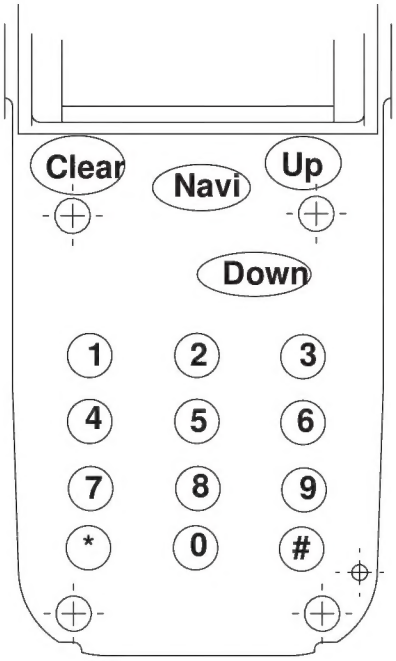
Typical value for node is marked with black when circuit is not active

Typical value for node is marked with gray when circuit is active

Keyboard Matrix

ROW/COL	0	1	2	3	4
0	NC	NC	NC	Down	NC
1	NC	Clear	Navikey	NC	Up
2	NC	1	4	7	*
3	NC	2	5	8	0
4	PWR switch	3	6	9	#

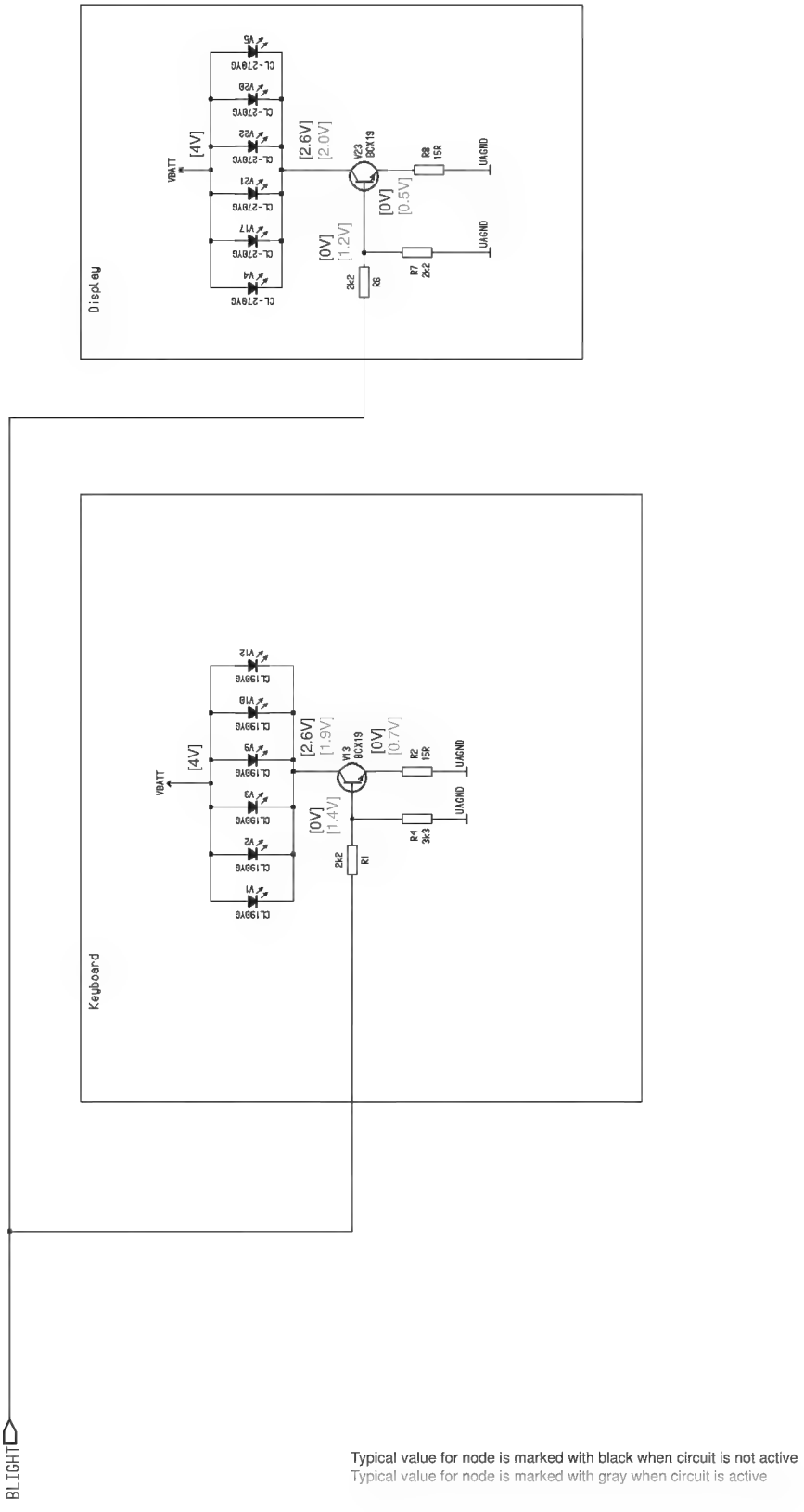
NC = Not Connected



Power Key

Micro switch is used as a power key on UI module. Circuitry includes micro switch and two diodes which is needed for MAD interface. Power key is connected to CCONT. Power switch is active in LOW state. The power key circuit can be seen from the Display Circuit diagram on page 8.The power key is connected to ROW4.

Backlighting



Display

Backlighting is provided by LEDs, three LED on right and three on left side of display. LEDs are compatible with CL270–YG and those are side illuminating. Light is on when LIGHT–signal is in HIGH state.

Color of LED is for

Pin	Line Symbol	Parameter	Mini-mum	Typical / Nomi-nal	Maxi-mum	Unit	Notes
14	VBAT	Battery voltage	3.0		5.1	V	Same supply for Buzzer & Keyboard
			43.4	51.4	59.6	mA	LEDs

Keyboard

In keyboard backlighting is made by 6 LEDs. LEDs are compatible with CL190–YG. Backlighting is on when LIGHT–signal is on HIGH state.

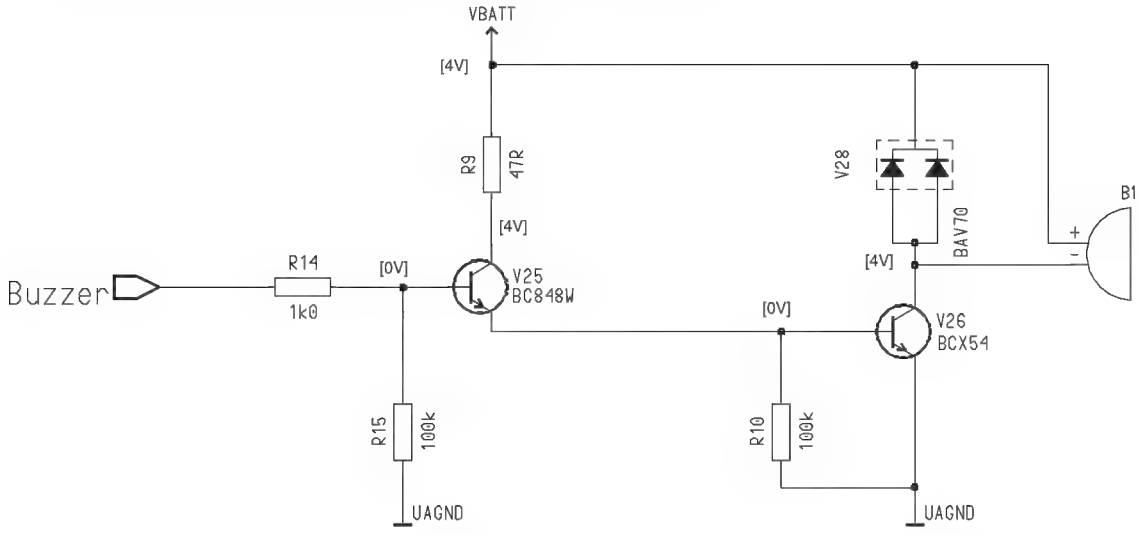
Color of LED is for

– Keyboard : yellow–green, λ = 570nm

Pin	Line Symbol	Parameter	Mini-mum	Typical / Nomi-nal	Maxi-mum	Unit	Notes
14	VBAT	Battery voltage	3.0		5.1	V	Same supply for Buzzer & Display
			55.3	62.4	69.9	mA	LEDs

Buzzer

Buzzer for DCT3 generation phone is SMD type.



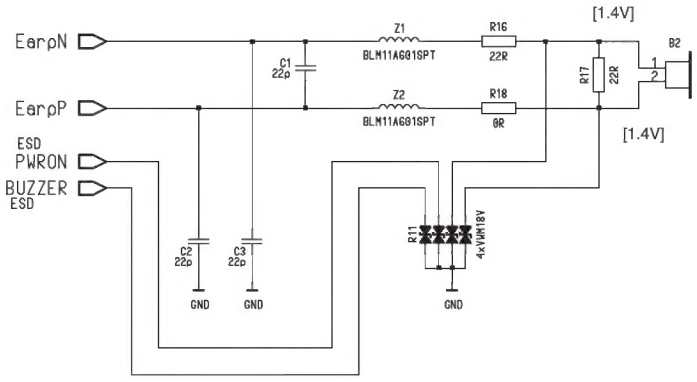
Typical value for node is marked with black when circuit is not active

Typical value for node is marked with gray when circuit is active

Speaker

The speaker is sealed to A–cover and UI PCB with silicon gasket. With that the frequency response is more constant. Speaker needs 6pcs of 1.2mm holes under component for leaking sound pressure into RF–section through UI module and 7pcs of 0.9mm holes left corner of UIM to leak from RF–section back to up cavity of phone. RF–section between UI module and engine acts like sound cage which is known. This gives better sound quality for Ultra and Santra phone and it can be estimated in several environments.

Silicon gasket and speaker itself acts like water proofing elements in that area. Water can come in speaker space between speaker and A–cover but not further from there into the phone. On A–cover is 3pcs of leaking holes which are not located top of the speaker. This holes gives better sound quality and less sensitive for how well phone is pressed against of head.



Typical value for node is marked with black when circuit is not active
Typical value for node is marked with gray when circuit is active

Parts list of UE4S (EDMS Issue 4.1) Code: 0201144

ITEM	CODE	DESCRIPTION	VALUE	TYPE
R001	1430043	Chip resistor	2.2 k	5 % 0.063 W 0603
R002	1430155	Chip resistor	15	5 % 0.063 W 0603
R004	1430047	Chip resistor	3.3 k	5 % 0.063 W 0603
R006	1430043	Chip resistor	2.2 k	5 % 0.063 W 0603
R007	1430043	Chip resistor	2.2 k	5 % 0.063 W 0603
R008	1430155	Chip resistor	15	5 % 0.063 W 0603
R009	1430167	Chip resistor	47	5 % 0.063 W 0603
R010	1430087	Chip resistor	100 k	5 % 0.063 W 0603
R011	1825009	Varistor network 4xvwm18v	1206	1206
R014	1430035	Chip resistor	1.0 k	5 % 0.063 W 0603
R015	1430087	Chip resistor	100 k	5 % 0.063 W 0603
R016	1430159	Chip resistor	22	5 % 0.063 W 0603
R017	1430159	Chip resistor	22	5 % 0.063 W 0603
C001	2320043	Ceramic cap.	22 p	5 % 50 V 0603
C002	2320043	Ceramic cap.	22 p	5 % 50 V 0603
C003	2320043	Ceramic cap.	22 p	5 % 50 V 0603
C004	2310784	Ceramic cap.	100 n	10 % 25 V 0805
C009	2310784	Ceramic cap.	100 n	10 % 25 V 0805
B001	5140087	Buzzer 85db 2600hz 3.6v 10x10x3.		10x10x3.5
Z001	3640035	Filt z>450r/100m 0r7max 0.2a 0603		0603
Z002	3640035	Filt z>450r/100m 0r7max 0.2a 0603		0603
H001	0200921	Gd40 lcd module		
V001	4864388	Led	Green	0603
V002	4864388	Led	Green	0603
V003	4864388	Led	Green	0603
V004	4860005	Led	Green	0603
V005	4860005	Led	Green	0603
V009	4864388	Led	Green	0603
V010	4864388	Led	Green	0603
V012	4864388	Led	Green	0603
V013	4200836	Transistor	BCX19	npn 50 V 0.5 A SOT23
V017	4860005	Led	Green	0603
V020	4860005	Led	Green	0603
V021	4860005	Led	Green	0603
V022	4860005	Led	Green	0603
V023	4200836	Transistor	BCX19	npn 50 V 0.5 A SOT23
V025	4210100	Transistor	BC848W	npn 30 V SOT323
V026	4200875	Transistor	BCX54–16	npn 45 V 1.5 A SOT89
V027	4100278	Diode x 2	BAV70	70V 200mA COM CAT.SOT23
V028	4100278	Diode x 2	BAV70	70 V 200 mA COM CAT.SOT23
S001	5200120	Push button switch 6.4x5.2 smd		

9795044	Keydomes	DMC01289	NSE–1NX
9854259	PCB UE4S 41.0X121.0X0.8 M4 4/PA		

This page intentionally left blank.